

RV



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,608	08/14/2001	John S. Quarterman	9674-20 CII (154577)	9682
23973	7590	11/10/2004	EXAMINER	
DRINKER BIDDLE & REATH ONE LOGAN SQUARE 18TH AND CHERRY STREETS PHILADELPHIA, PA 19103-6996			PWU, JEFFREY C	
			ART UNIT	PAPER NUMBER
			2143	

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

RV

Office Action Summary	Application No.	Applicant(s)	
	09/929,608	QUARTERMAN ET AL.	
	Examiner	Art Unit	
	Jeffrey Pwu	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-47 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/17/2002; 2/19/2003</u> | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 27 recites the limitation "an appropriate event detection" in the claim. There is insufficient antecedent basis for this limitation in the claim.
2. Claim 30 recites the limitation "the best squares line" in 27. There is insufficient antecedent basis for this limitation in the claim.
3. Claims 28-31 are objected to as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-29 and 31-47 are rejected under 35 U.S.C. 102(e) as being unpatentable over Mayton et al. (U.S. 6,763,380).

Mayton et al. disclose claims :

1. A method for measuring the performance (400) of at least a portion of a computer network, the method comprising the steps of:
providing one or more sampling lists, each sampling list identifying one or more nodes representative of a group of nodes of interest (col.3, lines 15-65; fig.6A);

Art Unit: 2143

sending signals to a relatively large number of nodes identified on the one or more sampling lists in a relatively short time; receiving signals from responding nodes on the one or more sampling lists (14, 15, 16, 17, 18, 20, 22, 24);

recording raw data indicative of the corresponding sent and received signals; reducing the raw data to data streams indicative of the performance of the nodes (305); and

presenting information derived from the data streams, the information being indicative of the performance of one or more of the groups of interest (305, 425).

2. The method of claim 1 wherein the providing step further comprises the steps of, gathering data regarding topology of the network, classifying nodes in an organized way based on the gathered data to create one or more lists of nodes for each group of interest, selecting nodes representative of each group of interest, and creating the sampling list for each group of interest from the selected nodes (col.5, line 66-col.6, line 51; “The test results may be obtained by active network testing or passive application monitoring at the endpoint nodes 14, 15, 16, 17, 18 with communications traffic over the communications network 12 being measured to provide test results, such as response time, transaction time, availability, throughput, and other measures as will be understood by those of skill in the art.”)

3. The method of claim 2 wherein the gathering step further comprises the steps of, obtaining a population survey that lists substantially all of the nodes on the network, extracting a list of main domains from the population survey, recording an example node for each main domain, and identifying the routes through which information travels between the example nodes and a beacon (see “traceroute utility”)

4. The method of claim 2 wherein the selecting step further comprises the step of trimming the one or more lists of nodes for the one or more groups of interest by excluding from consideration those nodes which are not important to the performance of other nodes (route analysis module 315).

5. The method of claim 4 wherein the selecting step further comprises the steps of, testing the remaining nodes on the one or more lists of nodes for each group of interest to determine reachability of each node, and removing unreachable nodes from the list (method steps 400-430; fig.4)

6. The method of claim 1 further comprising the steps of: weeding the one or more sampling lists by removing nodes which are unreachable for a predetermined amount of time, and adding new destinations to the sampling lists as the group of nodes of interest represented by each list increases in size (route analysis module 315).

7. The method of claim 1 further comprising the step of performing mathematical operations on the data streams to determine performance characteristics representative of a group of nodes of interest for a period of time (figs. 5, 6A, 6B, 6C, 6D, 6E).

8. The method of claim 1 further comprising the steps of: establishing a threshold value for a change in a performance metric as measured over time; analyzing the data streams using the threshold value to detect any significant changes in the value of a performance metric over time; determining that an event has occurred when a significant change is detected (315).

9. The method of claim 8 wherein the presenting step further comprises the step of automatically sending an email to interested users whenever an event is detected (310);
“Examples of applications to be monitored include Telnet, FTP, Lotus Notes, POP3 email, DNS, Web and other applications as will be understood by those of skill in the art which communicate, for example, using assigned ports of the client devices. The communication flows may be monitored, for example, by monitoring TCP/IP protocol stacks associated with the assigned ports of the client devices.”)

10. The method of claim 1 wherein the presenting step further comprises the step of creating a ratings table showing information indicative of the performance of one or more interesting groups of nodes (310).

11. The method of claim 10 wherein the information indicative of performance comprises two or more performance metrics (“Examples of applications to be monitored include Telnet, FTP, Lotus Notes, POP3 email, DNS, Web and other applications as will be understood by those of skill in the art which communicate, for example, using assigned ports of the client devices. The communication flows may be monitored, for example, by monitoring TCP/IP protocol stacks associated with the assigned ports of the client devices.”)

12. The method of claim 11 wherein the ratings table is user sortable by performance metric (310).

Art Unit: 2143

13. The method of claim 1 wherein the presenting step further comprises the step of creating a graph showing the performance of one or more interesting groups of nodes over time (“In addition, the illustrated console node 20 in FIG. 3 includes a graphical user interface module 320 which interfaces to a display 330 and a user input device 335, such as a mouse or a keyboard device. The graphical user interface module 320 is configured to display performance information including routing information for various connections on the display 330 as well as displaying other information related to user communications. The graphical user interface module 320 is further configured to receive user input from the user input device 335, such as a selection of a schedule for obtaining routing baseline information, and to provide the user input to the other modules of the console node 20, such as the route analysis module 315.”)

14. The method of claim 13 wherein the step of creating the graph further comprises the step of drawing a shaded region representing a detected performance event (col.10, line 58-col.11, line 19; “the data records may be individually stored in the storage device 305 and the report generation module 310 may filter those results to provide group results reflecting the network performance of various routes associated with different connections for which network performance measurement test results are available. For example, the network performance measurements may be grouped for display expressed as an average time for a type of network performance measurement characteristic associated with the respective measurements”).

15. The method of claim 14 further comprising the step of placing tags on borders of the shaded region, the tags comprising information indicative of the nature of the event, and wherein the shaded region further depicts the duration of the event (See “report generation module 310”).

16. The method of claim 1 further comprising the step of correcting the data within a data stream by adjusting the values of a performance metric based on geographic distance over which the sent and received signals traveled (310).

17. The method of claim 1 further comprising the step of correcting the data within a data stream by adjusting the values of a performance metric based on a previously observed metric value for the path over which the sent and received signals traveled (see feed back loops of figs. 2-3; 14, 15, 16, 17, 18, 20, 22, 24).

Claims 18-29 and 31-47 are similarly rejected as in claims 1-17:

Art Unit: 2143

18. A method for measuring the performance of a computer network, the method comprising the steps of: providing a survey of network nodes; creating at least one sampling list representative of at least a portion of the nodes; performing a process comprising the steps of, running a sending procedure which sends signals from a beacon to a plurality of nodes on the sampling list, the signals requesting responses from the plurality of nodes, simultaneously running a receiving procedure which receives return signals from responding nodes, such that the signal being received at any particular time could correspond with any of the signals sent to one of the plurality of nodes, and simultaneously running a recording procedure which records data characterizing the corresponding sent and received signals; performing data reduction on the data to create data streams comprising information indicative of the performance of at least a portion of the network; and presenting information derived from the data streams to a user such that the user is able to draw conclusions about the performance of at least a portion of the network. (14, 15, 16, 17, 18, 20, 22, 24; figs. 2-5).

19. The method of claim 18 further comprising the steps of, determining a size for a chunk that the beacon is capable of running through the process utilizing fast memory exclusively, reading a chunk into fast memory before running the sending, receiving, and recording procedures; writing the recorded data to slow memory after the sending, receiving, and recording procedures have been completed for the chunk, and repeating the reading step, sending, receiving, and recording procedures, and writing step on sequential chunks until all of the chunks have been run through the process.

20. The method of claim 19 wherein the chunk comprises an array of records, each record representing a node to be measured, and wherein the sending procedure further comprises the steps of, selecting a record from the chunk, transmitting a packet to the destination represented by the record, the packet being encoded with information corresponding to the selected record, identifying the record as having a packet in flight, and repeating the selecting, transmitting, and identifying steps as long as less than a predetermined number of packets are in flight.

21. The method of claim 20 wherein the sending procedure further comprises the step of incrementing a flying counter any time a packet is transmitted (col.3, lines 15-65; fig.6A).

Art Unit: 2143

22. The method of claim 21 wherein the receiving procedure further comprises the steps of, accepting a packet, determining whether the packet corresponds with a record identified as having a packet in flight, decrementing the flying counter if the packet corresponds to a record identified as having a packet in flight, and identifying any corresponding record as not having a packet in flight (14, 15, 16, 17, 18, 20, 22, 24);
23. The method of claim 20 wherein the receiving step further comprises the steps of, accepting a packet, and determining whether the packet corresponds with a record identified as having a packet in flight, and identifying any corresponding record as not having a packet in flight (see traceroute management tools)
24. A method of creating a sampling list for measuring performance of a group of nodes of interest on a large computer network, the method comprising the steps of: obtaining a population survey of the nodes on the network; gathering data regarding topology of the network; creating a list of nodes in the group of nodes of interest based on the gathered data; trimming the list of nodes by excluding from the list those nodes which are not important to the performance of other nodes; testing the remaining nodes on the list of nodes to determine reachability of each node; removing unreachable nodes from the list; categorizing the nodes on the list according to the service type the node provides; excluding nodes on the list that fall within over-represented service types for the particular emphasis of the group of nodes of interest (method steps of figs. 3-6)
25. A method of correcting data collected about one or more nodes remotely located from a data collection point, the method comprising the steps of: providing data comprising performance metrics, the data having been collected by a beacon at the collection point by sending signals to and receiving signals from one or more nodes; determining a great circle distance over which the signals traveled between the collection point and one or more nodes; calculating the time required for the signal to traverse the distance using the speed of light within the link and the determined distance for one or more nodes to find a geographic distance factor; and subtracting the appropriate geographic distance factor from the metric values within the data to provide corrected data (method steps of figs. 3-6).
26. A method of correcting new data collected about one or more nodes remotely located from a beacon, the method comprising the steps of providing pre-collected data, the pre-collected

Art Unit: 2143

data having been collected by the beacon by sending signals to and receiving signals from one or more nodes, and the data comprising performance metrics for a predetermined length of time; determining a baseline metric value for the pre-collected data to find a correction factor; subtracting the correction factor from the metric values within the new data to provide corrected data (method steps of figs. 3-6).

27. A general method for evaluating performance data of a computer network system, comprising: receiving performance data measured from a computer network system; selecting an appropriate event detection method to evaluate the performance data, the selected event detection method adapted to compare the performance data to threshold parameters to determine whether an event has occurred; sending a signal indicating an event has occurred whenever an event is detected by the appropriate event detection method (col.3, lines 15-65; fig.6A; tracer route detection).

28. The method for evaluating performance data of a computer network system according to claim 27, wherein the selected event detection method comprises: measuring the average value of performance data in a window representing a predefined number of data points; comparing the average value of the data points within the window to determine whether it falls within a threshold range; and recording an event if the average value of the performance data falls outside of the threshold range (col.3, lines 15-col.4, line 21).

29. The method for evaluating performance data of a computer network system according to claim 27, wherein the selected event detection method comprises: selecting a ratio threshold, an absolute minimum threshold value, and an absolute minimum difference threshold; determining the number of consecutive data points in a sequence making up a sliding window; selecting a first series of data points as a first sliding window; calculating a first average value of the data points in the first sliding window; selecting a second series of data points corresponding to the number of consecutive data points comprising a sliding window as a second sliding window, wherein the second sliding window comprises the data points in the first sliding window minus the oldest data point in the first sliding window, plus a new added data point that is the next data point in a sequence; calculating a second average value of the data points in the second sliding window; and recording an event if the ratio of the second average to the first average is greater than or equal to the ratio threshold, the second average exceeds an absolute minimum threshold

Art Unit: 2143

value, and the difference between the average value of the second window and the average value of the first exceeds an absolute minimum difference threshold (col.3, lines 15-col.4, line 21).

30. The method for evaluating performance data of a computer network system according to claim 27, wherein the selected event detection method comprises: setting a range of line slope values as a threshold range for event detection; setting an array of weights in a filter kernel to be applied to performance data points; adding data points to a filter window until a predetermined number of data points has been added to the filter window; applying the filter kernel to the data points in the filter window to produce filtered data points; adding filtered data points to a line fit window until a predetermined number of filtered data points is added to the line fit window; fitting the best least squares line to the filtered data points in the line fit window; determining the slope of the fitted line; comparing the slope of the fitted line to the threshold range of line slopes; and recording an event if the slope of the fitted line falls outside of the threshold range (col.3, lines 15-col.4, line 21).

32. A method of combining data streams comprising: providing two or more input data streams, the data streams representing data collected over a time interval, and each data stream comprising one or more records, each record including a start time indicating the time at which a collection process began collecting the data within the record and a value for one or more metrics; defining sequential time slices, each time slice comprising a piece of the interval and being the duration of the interval divided by a frequency; sorting the records from the two or more data streams by the start time; allocating each record into the time slice in which the start time for each record falls; calculating one or more statistics for each time slice, each statistic representing the value of one or more metrics for the records allocated to each time slice; and outputting a data stream comprising records which include the calculated statistics.

33. The method of claim 32 wherein the calculated statistics comprise medians (col.3, lines 15-col.4, line 21).

34. The method of claim 32 further comprising the step of defining an offset, wherein the first time slice begins at the first time frequency after the interval begins plus the offset (see "traceroute utility")

Art Unit: 2143

35. The method of claim 32 wherein the formats of the output data stream and each of the input data streams are identical.

36. A method of selectively notifying interested users of a performance event, the method comprising the steps of: receiving a signal indicating that an event has been detected and the type and magnitude of the event; composing an email message indicating that an event has been detected and the type and magnitude of the event; comparing the indications to records within a file comprising conditions in which users desire to be notified of performance events; automatically sending the email to users whose records included a condition met by the indications.

37. The method of claim 36 wherein the composing step further comprises the step of including in the email an auto-reply option which a user can quickly use to indicate that the user does not want to be notified of similar events in the future, and the method further comprising the step of updating the conditions in the responding user's record in the file.

38. A method of displaying performance characteristics of at least a portion of a network, the method comprising the steps of: providing values for metrics indicative of the performance of at least a portion of the network; and producing an image including cells organized in columns and one or more rows, each column representing a performance metric, each row representing at least a portion of the network, each cell including values for a metric as measured over one or more time intervals.

39. The method of claim 38 wherein the order in which portions of the network are listed is user sortable by metric.

40. A method of displaying performance characteristics of at least a portion of a network, the method comprising the steps of providing values for metrics indicative of the performance of at least a portion of the network; producing an image including a time versus metric graph indicative of the performance of at least a portion of the network; drawing a shaded region representing a detected performance event on the graph (310).

41. The method of claim 40 further comprising the step of placing tags on borders of the shaded region, the tags comprising information indicative of the nature of the event, and wherein the shaded region further depicts the duration of the event (310).

Art Unit: 2143

42. A method of collecting data from a large number of nodes on a computer network in a short time, the method comprising: providing a sampling list comprising information indicative of the addresses of nodes about which data is to be collected; and performing a process comprising the steps of, running a sending procedure which sends signals from a beacon to a plurality of nodes on the sampling list, the signals requesting responses from the plurality of nodes, simultaneously running a receiving procedure which receives return signals from responding nodes, such that the signal being received at any particular time could correspond with any of the signals sent to one of the plurality of nodes, and simultaneously running a recording procedure which records data characterizing the corresponding sent and received signals (col.3, lines 15-65; fig.6A).

43. The method of claim 42 further comprising the steps of, determining a size for a chunk that the beacon is capable of running through the process utilizing fast memory exclusively, reading a chunk into fast memory before running the sending, receiving, and recording procedures; writing the recorded data to slow memory after the sending, receiving, and recording procedures have been completed for the chunk, and repeating the reading step, sending, receiving, and recording procedures, and writing step on sequential chunks until all of the chunks have been run through the process (14, 20).

44. The method of claim 42 wherein the sent signals are pings (it is inherent in networks to use Ping and Traceroute signals to help troubleshoot network or Internet connections).

45. The method of claim 44 wherein the number of pings in flight is limited to a predefined value, pings in flight being those pings which have not timed out or for which a response has not yet been received (it is inherent in networks to use Ping and/or Traceroute signals to help troubleshoot network or Internet connections).

46. A method of collecting topological information about a large number of nodes on a computer network in a short time, the method comprising: providing a sampling list comprising information indicative of the addresses of example nodes; and performing a process comprising the steps of, running a sending procedure which sequentially sends a predetermined number of signals from a beacon toward each of a plurality of nodes on the sampling list, the sequentially sent signals being sequentially encoded with a time to live parameter, simultaneously running a

Art Unit: 2143

receiving procedure which receives return signals from responding hops along the route to each destination, the hops reporting an expired time to live, such that the signal being received at any particular time could correspond with any of the signals sent toward the plurality of nodes, and simultaneously running a recording procedure which records data characterizing the corresponding sent and received signals (steps 400-430; fig.4).

47. The method of claim 46 further comprising the steps of, determining a size for a chunk that the beacon is capable of running through the process utilizing fast memory exclusively; reading a chunk into fast memory before running the sending, receiving, and recording procedures; writing the recorded data to slow memory after the sending, receiving, and recording procedures have been completed for the chunk, and repeating the reading step, sending, receiving, and recording procedures, and writing step on sequential chunks until all of the chunks have been run through the process (see method steps of fig.5).

Allowable Subject Matter

6. Claim 31 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Pwu whose telephone number is 571 272-6798. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on 571 272-3923. Information regarding the status of an application may

Art Unit: 2143

be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Monday, November 08, 2004

**JEFFREY PWU
PRIMARY EXAMINER**